paper. However, if additional extensions of time are necessary to prevent abandonment of this application, then such extensions of time are hereby petitioned under 37 C.F.R. § 1.136(a), and any fees required therefor (including fees for net addition of claims) are hereby authorized to be charged to our Deposit Account No. 19-0036.

Amendments

In the Specification:

- Substitute the paragraph beginning on page 9, line 17, and ending on page 10, line 6, with the following paragraph:

Many different types of floating point formats exist and can be used to practice the present invention. However, it has been discovered that one floating point format, known as "s10e5," has been found to be particularly optimal when applied to various aspects of graphical computations. As such, it is used extensively throughout the geometric, rasterization, and frame buffer processes of the present invention. To optimize the range and precision of the data in the geometry, rasterization, and frame buffer processes, this particular s10e5 floating point format imposes a 16-bit format which provides one sign bit, ten mantissa bits, and five exponent bits. In another embodiment, a 17-bit floating point format designated as "s11e5" is specified to maintain consistency and ease of use with applications that use 12 bits of mantissa. Other formats may be used in accordance with the present invention depending on the application and the desired range and precision.

- Substitute the paragraph beginning on page 19, line 1, and ending on page 19, line 14, with the following paragraph:

For example, the maximum value that can be used in the 8-bit fixed point format is 127 (i.e., 2^8-1), which is written as 01111111 in binary, where the first digit represents the sign (positive or negative) and the remaining seven digits represent the number 127 in binary. In the prior art, this value is clamped and stored as 1.0 in the frame buffer. In an 8-bit floating point format, a value "n" is represented by the format n = s_eee_mmmmm, where "s" represents the sign, "e" represents the exponent, and "m" represents the mantissa in the binary formula $n = m \times 2^e$. Thus, in a floating point format, the largest number that can be written is 31×2^7, also written in binary as 01111111. In the present invention, the value is written to and stored in the frame buffer without being clamped or otherwise changed. Thus, use of the floating point format in the frame buffer permits greater flexibility in how a number can be represented, and allows for a larger range of values to be represented by virtue of the use of a portion of the data field to specify an exponent.

- Substitute the paragraph beginning on page 26, line 15, and ending on page 27, line 7, with the following paragraph:

Block 406 contains the clipping, perspective, and viewport application. Clipping refers to the elimination of the portion of a geometric primitive that is outside the half-space defined by a clipping plane. The clipping algorithm operates on floating point values. Perspective projection is used to perform foreshortening so that the farther an object is from the viewport, the smaller it appears in the final image. This occurs because the viewing volume for a perspective projection is a frustum of a pyramid. The matrix for a perspective-

view frustum is defined by floating point parameters. Selection and feedback modes are provided in block 407. Selection is a mode of operation that automatically informs the user which objects are drawn inside a specified region of a window. This mechanism is used to determine which object within the region a user is specifying or picking with the cursor. In feedback mode, the graphics hardware is used to perform the usual rendering calculations. Instead of using the calculated results to draw an image on the screen, however, this drawing information is returned. Both feedback and selection modes support the floating point format.

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- Substitute the paragraph beginning on page 27, line 9, and ending on page 28, line 15, with the following paragraph:

The actual rasterization is performed in block 408. Rasterization refers to converting a projected point, line, or polygon, or the pixels of a bitmap or image, to fragments, each corresponding to a pixel in the frame buffer 412. Note that all primitives are rasterized. This rasterization process is performed exclusively in a floating point format. Pixel information is stored in block 409. A single pixel (x,y) refers to the bits at location (x,y) of all the bitplanes in the frame buffer 412. The pixels are all in floating point format. A single block 410 is used to accomplish texturing, fog, and antialiasing. Texturing refers to the process of applying an image (i.e., the texture) to a primitive. Texture mapping, texels, texture values, texture matrix, and texture transformation are all specified and performed in floating point. The rendering technique known as fog, which is used to simulate atmospheric effects (e.g., haze, fog, and smog), is performed by fading object colors in floating point to a background floating point color value(s) based on the distance from the

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viewer. Antialiasing is a rendering technique that assigns floating point pixel colors based on the fraction of the pixel's area that is covered by the primitive being rendered. Antialiased rendering reduces or eliminates the jaggies that result from aliased rendering. In the currently preferred embodiment, blending is used to reduce two floating point color components to one floating point color component. This is accomplished by performing a linear interpolation between the two floating point color components. The resulting floating point values are stored in frame buffer 412. But before the floating point values are actually stored into the frame buffer 412, a series of operations are performed by per-fragment operations block 411 that may alter or even throw out fragments. All these operations can be enabled or disabled. It should be noted that although many of these blocks are described above in terms of floating point, one or several of these blocks can be performed in fixed point without departing from the scope of the present invention. The blocks of particular interest with respect to floating point include the rasterization 408; pixels 409; texturing, fog, and antialiasing 410; per-fragment operations 411; and frame buffer and frame buffer control 412 blocks.